

## Repair of Post-Infarction Ventricular Free Wall Rupture With TachoSil®

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**Introduction:** Left ventricular free wall rupture (LVFWR) is a frequent cause of death after acute myocardial infarction, and its repair remains a surgical challenge.

**Case Presentation:** TachoSil® is a ready-to-use equine collagen patch which has been successfully used for hemostasis in cardiovascular surgery. However, a limited number of studies have reported its application for LVFWR repair. In this study, we describe our initial experience using TachoSil® for LVFWR repair.

**Conclusions:** A hemodynamic study was acceptable at a 12-month follow-up, and no complication was seen.

**Keywords:** Heart Rupture; TachoSil; Ventricular Free Wall Rupture; Cardiac Surgery

### 1. Introduction

Myocardial rupture is a catastrophic and fatal complication after acute myocardial infarction, accounting for 14% to 26% of deaths in these patients. The appropriate surgical treatment varies significantly depending on the condition of the lesions. Despite improved results with wide sutureless techniques compared with conventional infarctectomy (1), free wall rupture still remains a surgical challenge. In this study, we describe our initial experience using TachoSil® for left ventricular free wall rupture (LVFWR) repair.

### 2. Case Presentation

A dyspneic 69-year-old male was referred for further management to our tertiary referral hospital with suspicion of pericardial effusion and cardiac tamponade. He suffered typical chest pain, diaphoresis, and an anterior myocardial infarction 3 days before admission to our hospital and was treated with streptokinase in a general medical center. He also underwent dopamine and dobutamine therapy in that center because of a significant reduction in his blood pressure.

On admission, he had a pulse rate of 105 bpm, a blood pressure of 80/65 mmHg, and a respiratory rate of 25 (O<sub>2</sub> saturation = 92%). On physical examination, he had muffled heart sounds and a fine crackle in the lower two-thirds of both lungs. His jugular venous pressure was higher than normal, and his electrocardiography showed sinus rhythm with significant Q waves in V1 through V6 precordial leads.

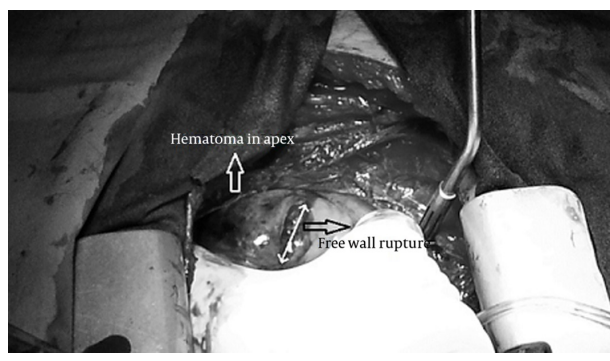
Initial transthoracic echocardiography showed a severe

abnormal left ventricular ejection fraction (LVEF = 20%) with a massive pericardial effusion with hemodynamic effect (right ventricular outflow tract collapse). The results were highly suggestive for rupture of the apical septal myocardium with clot formation.

The operation was performed through a standard median sternotomy. The proximal part of pericardium was partially opened, and a controlled amount of blood was removed gradually, which immediately improved his hemodynamic indices. Standard cardiopulmonary bypass (CPB) was performed with mild hypothermia (32°C) and standard cardioplegic myocardial preservation. The heart was arrested, and the pericardium was opened completely. Thereafter, the remaining blood was drained. A large myocardial infarction in the apex was seen, and the sub-epicardial hematoma extended to the lateral side of left and right ventricular free wall. This resulted in intramural perforation of the apex (Figure 1). The distal part of the LAD was inside the hematoma and was not suitable for graft anastomosis. Under dry conditions, a 95 × 48 mm piece of TachoSil® patch was positioned on the area and was pressed to the surface of the ventricle for 5 minutes. This was repeated two times after which no bleeding was observed. Thereafter, a large autologous pericardial patch was fixed over the surface covered by TachoSil® fleece far from fragile necrotic tissue with a few separate 6 - 0 Prolene sutures to obtain maximal adhesion to the epicardial surface. Finally, a generous Teflon felt patch was sewn over all previous patches to reinforce adhesion and avoid blood oozing (Figure 2). The aortic cross-clamp

was released, and the patient was weaned from CPB after normothermia with normal sinus rhythm, epinephrine, and insertion of an intra-aortic balloon pump. The CPB and aortic cross-clamp times were 112 and 47 minutes, respectively. No bleeding occurred during the follow-up period.

The patient was alive and had a good clinical status 12 months later. Postoperative and follow-up transesophageal echocardiography showed normal left and right ventricular size (LVEF of 30% - 35%) without pseudo-aneurysm. All apical, inferoseptal, and anteroseptal segments showed akinesia. Echocardiography also revealed anterior hypokinesia. There was no ventricular septal defect. The pericardium was normal without any effusion.



**Figure 1.** Intramural Hematoma in the Apex and Left Ventricular Free Wall Rupture



**Figure 2.** Repair of Free Wall Rupture with TachoSil® and Pericardial Patch

### 3. Discussion

Since the first case report of successful treatment of post-infarction cardiac rupture with a sutureless technique in 1988, many alternatives have been described in the literature to cover myocardial perforations, including Teflon, Dacron, Gore-Tex or pericardial patches and dif-

ferent biological glues (1). The introduction of sutureless techniques for LVFWR repair corresponded with a great decrease in operative mortality rates (2).

TachoSil®, a ready-to-use surgical patch that consists of a white collagen sponge coated on one side with fibrinogen and thrombin that allows hemostasis and tissue sealing, has been used in various cardiovascular surgical procedures. A limited number of studies have reported treatment of LVFWR with a TachoSil® patch. Muto et al. (3) reported a case of oozing type LVFWR localized on the lateral wall. Pocar et al. (4) treated 3 patients with LVFWR with the TachoSil® patch and the addition of a second layer of pericardium to reinforce the rupture area during CPB. TachoComb use has also been advocated by some authors (2) to prevent re-rupture occurring from oozing type ruptures. The most recent study was performed by Raffa et al. (5), in which 6 consecutive patients affected by LVFWR were treated using the TachoSil® patch. All these studies showed promising results. However, the number of patients who have been treated with this technique is still limited.

Our study, which is among initial reports of using TachoSil® in LVFWR treatment, also demonstrated satisfactory results after a 12-month follow-up and showed that a TachoSil® patch reinforced by a pericardial and Teflon felt patch is an easily reproducible and fast technique to deal with oozing type myocardial ruptures due to myocardial infarction. Although this result confirmed previous reports, further investigations are needed to establish long-term follow-up after TachoSil® patch application.

### Authors' Contributions

Acquisition of data: Maziar Gholampour-Dehaki, Hoda Javadikasgari, Asghar Zare, Mohsen Madani. Drafting of the manuscript: Maziar Gholampour Dehaki, Hoda Javadikasgari, Asghar Zare, Mohsen Madani. Critical revision of the manuscript for important intellectual content: Maziar Gholampour Dehaki, Hoda Javadikasgari, Asghar Zare, Mohsen Madani. Administrative, technical, and material support: Maziar Gholampour Dehaki, Hoda Javadikasgari, Asghar Zare, Mohsen Madani.

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